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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/253,611 02/19/99 FARRAR

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EXAMINER

POMPEY, R

ART UNIT

PAPER NUMBER

2812

DATE MAILED:

12
09/27/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trad marks

Office Action Summary

Application No.
09/253,611

Applicant(s)
Farrar

Examiner
Ron Pompey

Art Unit
2812



-- The MAILING DATE of this communication appears on the cover sheet with the corresponding address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on Jul 12, 2001

2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 35 C.D. 11; 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) 1-23 and 64-75 is/are pending in the application.

4a) Of the above, claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) 1-23 and 64-75 is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claims _____ are subject to restriction and/or election requirements.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

a) ☐ All b) ☐ Some* c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. _____.

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

15) ☒ Notice of References Cited (PTO-892)

18) ☐ Interview Summary (PTO-413) Paper No(s). _____

16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

19) ☐ Notice of Informal Patent Application (PTO-152)

17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____

20) ☐ Other: _____

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DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-24 and 64-67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cook et al. (US 5,457,345) in view of Thomas (US 4,661,375) and Strube et al. (US 4,650,548).

Cook disclose the steps of:

For claims 1-24 and 64-67:

forming a metal contact pad on a substrate (12, fig. 1);

forming an insulating layer on the metal contact pad (14, fig. 1);

removing a portion of the insulating layer to expose a portion of the metal contact pad, thereby forming an exposed portion of the metal contact pad;

depositing solder (46, fig. 4), wherein at least one material is selected from the group consisting of lead, tin and bismuth, on the exposed portion of the metal contact pad (44, fig. 4) using selective deposition, further comprises depositing solder on the exposed portion of the metal contact pad using a deposition process selected from the

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group consisting of immersion contact, chemical vapor deposition and electrolytic deposition, thereby forming a solder contact (col. 5, Ins. 1-10 and 37-49); and

annealing the solder contact to form a solder ball contact (col. 1, Ins. 36-44), having a diameter in a range of about 2.5 microns to no greater than 100 microns(col. 2, Ins. 1-5).

3. Cook fails to disclose some or all the limitations of claims 1, 8-12 and 13-23.

However,

a. Thomas discloses the steps of:

For claims 1, 9-10 and 68:

deposition of the solder by immersion.

b. Strube discloses the steps of:

For claims 13-23 and 69-70:

electrolytically depositing solder on the exposed portion of the metal contact pad.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the steps disclosed by Strube in Cook, because said immersion and electrolytically deposition methods are conventional ways to deposit a solder.

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c. For claims 8-12, 15, 20, 23 and 71-75:

further comprises forming an exposed portion of the metal contact pad having a diameter specific diameter;

wherein the insulating layer has a thickness of approximately 1.5 microns; and

wherein the layer of tin has a thickness of approximately 1.42 microns, further

wherein the layer of lead and the layer of tin form a solder contact having a thickness of approximately 2.33 microns.

The examiner takes official notice that it is well known in the art and therefore, *prima facie* obvious to incorporate the above limitations in Cook or Thomas and Strube, because they are conventional thicknesses diameters and deposition process. Due to the request by the applicant to verify that these limitations are well known Mohsen, 112 or 111, Fig. 1f, column 5, lines 50-65, disclose insulating layer of thickness 1.5 microns and via that is about 1-2 micron.

Response to Arguments

4. Applicant's arguments filed 7-10-01, pertaining to claims 1-23 and 64-75, have been fully considered but they are not persuasive.

Applicant argues, page 6, that Cook does not teach or suggest depositing solder by a process selected from the group consisting of immersion contact, chemical vapor

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deposition and electrolytic deposition. However, in column 6, line 28-29, Cook states "The solder contact is also formed by evaporation, or other suitable means." Therefore that would comprise the other deposition processes listed above.

Applicant argues, page 7, that Thomas teaches away from annealing as set forth in the claimed invention. However, in column 4, line 19-21, Thomas states "... layers have been deposited they are exposed to an elevated temperature sufficient to homogenize all the deposited alloys into a single alloy." Therefore, Thomas does suggest an annealing step after depositing the solder.

Also, on page 7, applicant argues that Strube does not teach electrolytic deposition of solder on the solder contact extending below the resist layer and below a surface of the insulating layer. However, Cook does disclose depositing a solder in this manner and Strube is used only to demonstrate that it is well known to form a solder by electrolytical deposition.

Applicant argues, on page 8, that under M.P.E.P. section 2144.03 that the examiner show prior art that verifies the official notice that was taken in regard to wherein the insulating layer has a thickness of approximately 1.5 microns; and wherein the layer of lead and the layer of tin form a solder contact having a thickness of approximately 2.33 microns. Mohsen ss disclosed in the rejections above, due to the request by applicant for additional art of an official notice reasoning for rejection, reads on these limitations and therefore the rejections are upheld. Applicant, also, has not

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shown why the size of the via is not a determining factor in the thickness and diameter of a solder ball.


Conclusion

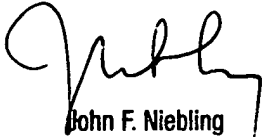
5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ron Pompey whose telephone number is (703) 305-

3016.


Ron Pompey
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September 25, 2001


John F. Niebling
Supervisory Patent Examiner
Technology Center 2800